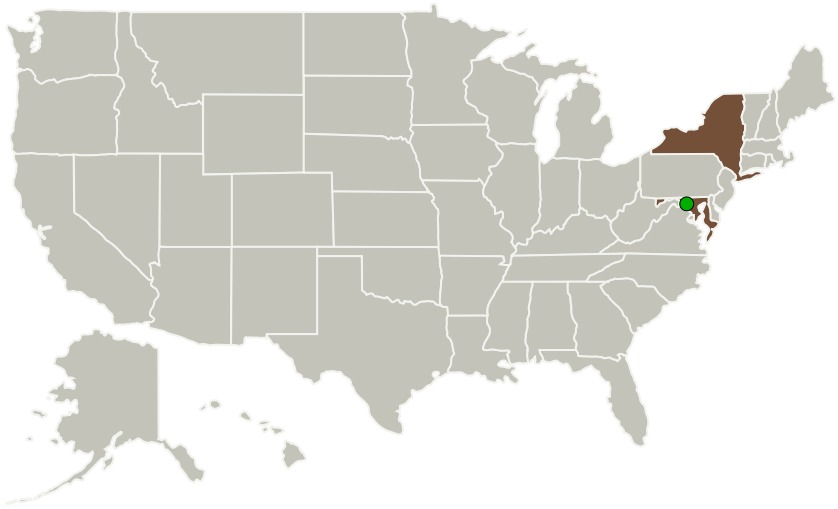
A Comet Surface Sample Return System, Phase II

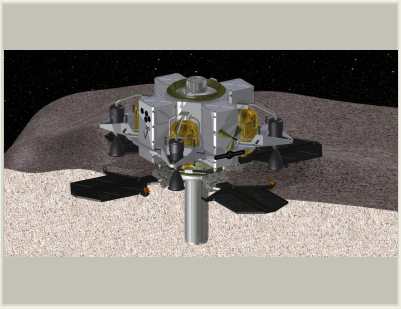
Completed Technology Project (2014 - 2016)

Project Introduction

The proposed Phase II investigation will focus on the development of spacecraft systems required to obtain a sample from the nucleus of a comet, hermetically seal the sample within a capsule, and return the sealed sample to an orbiting spacecraft which can return the sample to Earth. A systems level concept for the Comet Surface Sample Return Probe has been developed in Phase I. This concept will be refined during the proposed Phase II investigation, including high fidelity prototypes and analyses of critical subsystems. These high fidelity prototypes will include the sample acquisition and handling subsystem, a hermetically sealed sample return canister, and a full scale mockup of the Comet Surface Sample Return Probe. Orbital mechanics calculations were completed in Phase I based on simplified geometry assumptions of the comets shape and density in order to determine the feasibility of orbiting, impacting and ascending from the comets surface with a small scale spacecraft. During Phase II, these analyses will be refined to include uneven geometry and inconsistent density.

Primary U.S. Work Locations and Key Partners





A Comet Surface Sample Return System, Phase II

Table of Contents

A Comet Surface Sample Return System, Phase II

Completed Technology Project (2014 - 2016)

Organizations Performing Work	Role	Type	Location
Honeybee Robotics, Ltd.	Lead Organization	Industry	Pasadena, California
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	New York

Project Transitions

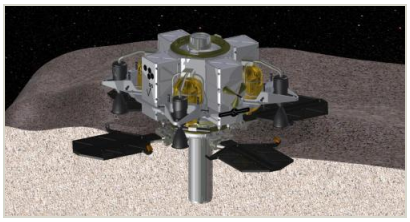
June 2014: Project Start

December 2016: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137464)*

Images



Briefing Chart Image
A Comet Surface Sample Return System, Phase II *(https://techport.nasa.gov/image/135651)*

Final Summary Chart Image
A Comet Surface Sample Return System, Phase II Project Image *(https://techport.nasa.gov/image/135551)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Honeybee Robotics, Ltd.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Philip C Chu

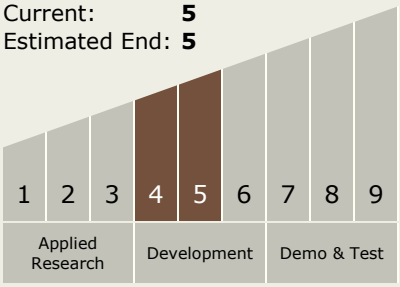
Co-Investigator:
Philip G Chu

A Comet Surface Sample Return System, Phase II

Completed Technology Project (2014 - 2016)

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.2 Navigation Technologies
    - TX17.2.3 Navigation Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System